

**A.G& S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE**

VUYYURU-521165, KRISHNA Dt., A.P.(Autonomous)

Accredited by NAAC with "A" Grade

2019-2020



DEPARTMENT OF CHEMISTRY

MINUTES OF BOARD OF STUDIES

EVEN SEMESTER

1-10-2019

Minutes of the meeting of Board of studies in Chemistry for the Autonomous course of A.G. & S.G. Siddhartha Degree College of Arts & Science, Vuyyuru held at 10.30 A.M on 01-10-2019 in the Department of Chemistry.

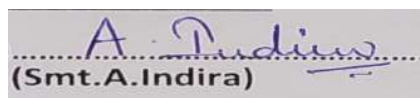
Smt A.INDIRA Presiding

Members Present:

- 1) *A. Indira* Chairman HOD, Dept. of Chemistry,
(Smt.A.Indira) A.G. & S.G.S.Degree College,Vuyyuru.
- 2) *DR R A* University Nominee Assistant Professor,
(Prof.D.Ramasekhar Reddy) Dept. of Chemistry,Krishna University, MTM.
- 3) *K.A Emanuel* Academic Council Nominee Associate Professor in Chemistry,
(Dr.K.A.Emanuel) Sir C.R.Reddy College,Eluru.
- 4) *D.D Bala karuna kumar* Academic Council Nominee Associate Professor in Chemistry,
(Dr.D.Bala karuna kumar) A.L.C College,Vijayawada.
- 5) *N Nadella Taraka Ramarao* Industrialist Manager, Q.C, Divis Laboratories Ltd,
(Dr.Nadella Taraka Ramarao) Vizag.
- 6) *V Phani Kumar* Student Nominee Lecturer in Chemistry,
(Dr.V.Phani Kumar) SRR&CVR Govt. Degree College, BZA.
- 7) *K. Ramesh* Member Lecturer in Chemistry,
(Sri.K.Ramesh) A.G. & S.G.S.Degree College,Vuyyuru
- 8) *M. Venkata Santhi* Member Lecturer in Chemistry,
(Smt.M.V.Santhi) A.G. & S.G.S.Degree College,Vuyyuru.
- 9) *G. Ramesh* Member Lecturer in Chemistry,
(Sri.G.Ramesh) A.G.& S.G.S.Degree College, Vuyyuru.
- 10) *P. Suresh* Member Lecturer in Chemistry,
(Sri.P.Suresh) A.G. & S.G.S.Degree College,Vuyyuru.
- 11) *M. Santhi* Member Lecturer in Chemistry,
(Ms.M.Santhi) A.G. & S.G.S.Degree College,Vuyyuru.
- 12) *J. Nageswara Rao* Member Rtd.Lecturer in Chemistry,
(Sri.J.Nageswara Rao) A.G. & S.G.S.Degree College,Vuyyuru.

Agenda for B.O.S Meeting

1. To recommend the syllabus and model paper for II semesters of I Degree B.Sc., Chemistry for the Academic year 2019-2020.
2. To recommend the syllabus and model papers for IV semesters of II Degree B.Sc., Chemistry for the Academic year 2019-2020.
3. To recommend the syllabus and model papers for VI semesters of III Degree B.Sc. Chemistry for the Academic year 2019-20.
4. To recommend the Blue print of II, IV, & VI semesters of B.Sc. Chemistry for the Academic year 2019-20.
5. To recommend the Guidelines to be followed by the question paper setters in Chemistry for Semester – end exams.
6. To recommend the teaching and evaluation methods to be followed under Autonomous status.
7. Any suggestions regarding certificate course, seminars, workshops, Guest lecture to be organized.
8. Recommend the panel of paper setters and Examiners to the controller of Examinations of autonomous Courses of A.G. & S.G.S.Degree colleges of Arts & Science, Vuyyuru.
9. Any other matter.



A. Indira
(Smt. A. Indira)

Chairman.

RESOLUTIONS

- 1) It is resolved to continue the same **syllabus and modified model paper for II semesters of I B.Sc.** under Choice Based Credit System (CBCS) for the Academic year 2019-20also.
- 2) It is resolved to implement the changed syllabus **and model papers** under Choice Based Credit System (CBCS) for the Academic year 2019-20 for **IV semesters of II B.Sc.**
 - **IN UNIT-4 Photo chemistry topic will be added & in unit-5 Phase rule will be added**
- 3) It is resolved to implement the same **syllabus and model papers** under Choice Based Credit System (CBCS) of 2018-19 for the Academic year 2019-20for **VI semesters (General elective-A and cluster Elective-C) of III B.Sc.**
- 4) It is resolved to follow the **Blue prints** of II, semesters of Degree B.Sc. for the Academic year 2019-20. It is resolved to continue the same **Blue prints** of IV, and VI semesters of Degree B.Sc. for the Academic year 2018-19.
- 5) It is resolved to follow the same guidelines to be followed by the question paper setters for Chemistry II, semesters of Degree B.Sc. for the Academic Year 2018-19. III, IV, V and VI semesters of Degree B.Sc. for the Academic Year 2019-20.
- 6) It is resolved to continue the following teaching and evaluation methods for Academic year 2019-20.

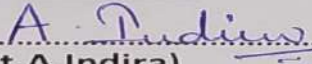
Teaching Methods:

Besides the conventional methods of teaching, we use modern technology i.e. using of LCD projector to display on U boards etc, for better understanding of concepts.

Evaluation of a student is done by the following procedure:

- **Internal Assessment Examinations:**
- Out of maximum 100 marks in each paper for IB.Sc , 30 marks shall be allocated for internal assessment .
- Out of these 30 marks, **20 marks are allocated for announced tests (i.e.IA-1 & IA-2)**. Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, **5 marks** are allocated on the basis of candidate's **percentage of attendance and remaining 5 marks are allocated for the innovative component like assignment/quiz/seminars for IB.Sc.**
- There is **no passing minimum** for internal assessment for I.B.Sc.
- Out of maximum 100 marks in each paper for II&III, 25 marks shall be allocated for internal assessment.
- Out of these 25 marks, **15 marks are allocated for announced tests (i.e.IA-1 & IA-2)**. Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, **5 marks** are allocated on the basis of candidate's **percentage of attendance and remaining 5 marks are allocated for the assignment for II, &III B.Sc.**
- **Semester – End Examination:**
- The maximum mark for IB.Sc Semester – End examination shall be 70 marks and duration of the examination shall be 3 hours. Even though the candidate is absent for two IA exams /obtain Zero marks the external marks are considered (if the candidate gets 40/70) and the result shall be declared as "PASS".
- The maximum marks for II & III B.Sc Semester – End examination shall be 75 marks and duration of the examination shall be 3 hours.

- Semester – End examinations shall be conducted in theory papers at the end of every semester, while in practical papers, these examinations are conducted at the end of I, II, III, IV, V, VI semesters **for I, II & III B.Sc.**
- 7) Discussed and recommended for organizing **certificate course, seminars, Guest lecturers, workshops** to upgrade the knowledge of students, for the approval of the academic council.
- 8) Discussed and empowered the Head of the department of Chemistry to suggest the panel of paper setters and examiners to the controller of examinations. **Department of Chemistry Adopted Value Added Course “Air Pollution”.**
- 9) NIL.


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(Smt.A.Indira)

Chairman

SEMESTER - II	PAPER CODE :CHE-201C
PAPER TITLE : INORGANIC, ORGANIC & PHYSICAL CHEMISTRY, PAPER- II	

60 hrs (4 h / w) Credits - 3

INORGANIC CHEMISTRY

UNIT – I

1. d-block elements

Characteristics of d-block elements with special reference to electronic configuration, variable valence, Colour, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states.

UNIT-II

1. f-block elements:

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, Consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

2. Chemical Bonding

Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo nuclear and hetero-nuclear diatomic molecules (N₂, O₂, CO and NO).

ORGANIC CHEMISTRY

UNIT-III

Benzene and its reactivity

- Concept of resonance, resonance energy. Heat of hydrogenation, heat of combustion of Benzene, mention of C-C bond lengths and orbital picture of Benzene.
- Aromaticity - Huckel's rule - application to Benzenoid (Benzene & Naphthalene) Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)
- Reactions - General mechanism of electrophilic substitution, mechanism of nitration, Friede-Craft's alkylation and acylation.
- Orientation - Definition, ortho, para and meta directing groups, examples.
- Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens (Explanation by taking minimum of one example from each type)

UNIT-IV

1. Halogen compounds

- Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, arylalkyl, allyl, vinyl, benzyl halides.
- Nucleophilic aliphatic substitution reaction- classification into SN^1 and SN^2 – reaction mechanism with examples – Ethyl chloride, t-butyl chloride and optically active alkylhalide 2-bromobutane.

2. Hydroxy compounds

- Nomenclature and classification of hydroxy compounds.
- **Alcohols:** Preparation with hydroboration reaction, Grignard synthesis of alcohols.
- **Phenols:** Preparation- i) from diazonium salt, ii) from aryl sulphonates, iii) from cumene.
- **Chemical properties:**
Dehydration of alcohols. Oxidation of alcohols by CrO_3 , $KMnO_4$.
- Special reaction of Phenols: Bromination, Kolbe-Schmidt reaction, Reimer-Tiemann reaction, Fries rearrangement, azocoupling, Pinacol- Pinacolone rearrangement.

PHYSICAL CHEMISTRY

UNIT-V

Solutions

- Types of solutions, Solutions of liquids in liquids, Raoult's law, Ideal & Non -ideal solutions, Difference b/n ideal and Non-ideal solutions.
- Liquid mixtures-Completely miscible liquid mixtures-examples-Azeotropes (a.HCl-H₂O,b.Ethanol-water) Fractional distillation.
- Partially miscible liquids mixtures-Phenol –water, Triethyl amine-water & Nicotine-water system. Effect of impurity on consolute temperature.
- Immiscible liquid mixtures-steam distillation-Nernst distribution law & its applications. Henrys law-applications.

List of Text & Reference Books

1. Inorganic Chemistry J E Huheey, E A Keiter and R L Keiter
3. A Text Book of Organic Chemistry by Bahl and Arun bahl
4. A Text Book of Organic chemistry by I L Finar Vol
5. Advanced Organic Chemistry by F A Carey and R J Sundberg
6. Advanced Physical chemistry by Bahl and Tuli
7. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

SEMESTER – II	COURSE CODE : CHE-201C
PAPER TITLE : PHYSICAL AND GENERAL CHEMISTRY, PAPER – II	

Time: 3Hours

Maximum marks: 70

Pass marks: 28

SECTION-A

Answer any **FOUR** of the following. Each question carries 5 marks. 4X5=20

1. Define and explain space lattice and unit cell.?
2. Define law of symmetry? Explain about centre of symmetry?
3. Define critical constants?
4. Define Henry's law and their limitations?
5. Define and explain Bond order?
6. Explain about symmetry elements?
7. Explain about Specific rotation?

SECTION-B

Answer **any FIVE** questions. Each question carries 10 marks. 5X10=50

8. Derive Bragg's equation?
9. Derive Vanderwaal's equation of real gases.?
10. Write the differences between Solids and Liquids?
11. Define Nernst distribution law and their limitations. Explain two applications of distribution law/
12. Explain about Fractional distillation and steam distillation
13. Explain Langmuir adsorption isotherms.
14. Explain the shape of $\text{Ni}(\text{CO})_4$ based on valence bond theory
15. Explain about optical isomerism of Tartaric acid?

**The Guidelines to be followed by the question paper setters in chemistry for the
II-Semester - end exams ACADEMIC YEAR-2019-20**

SEMESTER – II	PAPER CODE : CHE-201C
PAPER TITLE : PHYSICAL AND GENERAL CHEMISTRY, PAPER - II	

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (20 Marks)	1 + 1	1
Unit-2 (25 Marks)	1	1 + 1
Unit-3 (25Marks)	1	1 + 1
Unit-4 (25 Marks)	1	1 + 1
Unit-5 (20 Marks)	1+1	1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VUYYURU.
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PRACTICAL SYLLABUS ACADEMIC YEAR-2019-20

Analysis of Salt mixture	PAPER CODE : CHE-201P
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30 hrs (2 h / w) Credits: 2

Qualitative inorganic analysis:

Analysis of mixture salt containing two anions and two cations (From two different groups) from the following:

Anions: Carbonate, sulphate, chloride, bromide, acetate, nitrate, borate, phosphate.

Cations: Lead, copper, iron, aluminum, zinc, manganese, calcium, strontium, barium, Potassium and ammonium.

- 1. Analysis of salt mixture-I**
- 2. Analysis of salt mixture -II**
- 3. Analysis of salt mixture-III**
- 4. Analysis of salt mixture -IV**
- 5. Analysis of salt mixture -V**
- 6. Analysis of salt mixture-VI**

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VUYURU
(Accredited at "A" Grade by NAAC, Bangalore) ACADEMIC YEAR-2019-20

Analysis of Salt mixture	PAPER CODE : CHE-201P
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SCHEME OF VALUATION

INTERNAL MARKS

- Record =10 M

EXTERNAL MARKS (40 marks)

- Viva.....10M
- PRACTICAL EXAMINATION -30M
 - Identification of anion 6 M
 - Confirmation test for anion 6M
 - Group separation table with correct group 10 M
 - Confirmation test for cation 6 M
 - Report 2 M

TOTAL=50 M

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SEMESTER – IV	SUBJECT: CHEMISTRY	PAPER CODE: CHE-401C
PAPER TITLE: INORGANIC,ORGANIC SPECTROSCOPY & PHYSICAL CHEMISTRY, PAPER-IV		

60 hrs (4h/w)

Credits-3

INORGANIC CHEMISTRY

UNIT- I

Coordination Chemistry-I:

- IUPAC nomenclature - bonding theories - Review of Werner's theory and Sidgwick's Concept of coordination - Valence bond theory - geometries of coordination numbers- 4-tetrahedral and square planar and 6-octahedral and its limitations.

ORGANIC SPECTROSCOPY

UNIT-II

1. Spectrophotometry

- General features of absorption - Beer-Lambert's law and its limitations, transmittance, Absorbance, and molar absorptivity. Single and double beam spectrophotometers.
- Application of Beer-Lambert law for quantitative analysis of 1. Chromium in $K_2Cr_2O_7$
2. Manganese in Manganous sulphate

2. Electronic spectroscopy:

- Interaction of electromagnetic radiation with molecules and types of molecular spectra. Energy levels of molecular orbitals (σ , π , n). Selection rules for electronic spectra.
- Types of electronic transitions in molecules effect of conjugation.
Concept of chromophore and auxochrome

UNIT-III

1. Infra red spectroscopy

- Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

2. Proton magnetic resonance spectroscopy (1H-NMR)

- Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants.
- Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

PHYSICAL CHEMISTRY

UNIT-V

Electrochemistry

- Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Application of conductivity measurements- conductometric titrations.
- Arrhenius theory of electrolyte dissociation and its limitations.
- Ostwald's dilution law. Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only).
- Definition of transport number, determination by Hittorfs method.

- Single electrode potential, Nernst equation, Reversible and irreversible cells, Types of electrode- Standard Hydrogen electrode, calomel electrode, Indicator electrode, metal – metal ion electrode, Inert electrode.
- Applications of EMF measurements -Potentiometric titrations.

Text of Text Books

1. Advanced physical chemistry by Guru deep Raj
2. Introduction to Electrochemistry by S. Glasstone
3. Elementary organic spectroscopy by Y.R. Sharma
4. Spectroscopy by P.S.Kelsi
5. Unified chemistry Vol- II by O.P.Agarwal
6. Unified chemistry Vol- II by K.Ramarao and Y. R. Sharma (Kalyani Publishers)

List of Reference Books

1. Spectroscopy by William Kemp
2. Spectroscopy by Pavia
3. Organic Spectroscopy by J. R. Dyer
4. Modern Electrochemistry by J.O. M. Bockris and A.K.N.Reddy

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SEMESTER – IV	PAPER CODE : CHE-401C
PAPER TITLE : SPECTROSCOPY AND PHYSICAL CHEMISTRY, PAPER-IV	

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any **FIVE** of the following. Each question carries 5 marks. **5X5=25**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION-B

Answer **any FIVE** questions. Each question carries 10 marks. **5X10=50**

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16

**The Guidelines to be followed by the question paper setters in chemistry for the
IV-Semester - end exams**

SEMESTER – IV	SUBJECT: CHEMISTRY	PAPER CODE: CHE-401C
PAPER TITLE : SPECTROSCOPY & PHYSICAL CHEMISTRY, PAPER-IV		

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (40 Marks)	1 + 1	1 + 1
Unit-2 (15 Marks)	1	1 + 1
Unit-3 (15 Marks)	1	1
Unit-4 (20 Marks)	1 + 1	1
Unit-5 (30 Marks)	1 + 1	1 + 1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

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Instrumentation	PAPER CODE : CHE - 401 P
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PRACTICAL SYLLABUS

30 hrs (2h /w) Credits-2

I. Conductometric Titrations

1. Determination of concentration of HCl conductometrically using standard NaOH solution.
2. Determination of concentration of acetic acid conductometrically using standard NaOH Solution.

II. Potentiometric titrations

3. Determination of Concentration of Ferrous ion potentiometrically using standard KMnO_4 solution.
4. Determination of concentration of ferrous ion potentiometrically using standard $\text{K}_2\text{Cr}_2\text{O}_7$ Solution.

III. Colorimetric titrations

5. Verification of Beer-Lamberts Law for KMnO_4 solution and determine the concentration of given test solution.
6. Verification of Beer-Lamberts Law for $\text{K}_2\text{Cr}_2\text{O}_7$ solution and determine the concentration of given test solution.

IR Spectral Analysis

IR Spectral Analysis of the following functional groups with examples

- a) Hydroxyl groups
- b) Carbonyl groups
- c) Amino groups
- d) Aromatic groups

SCHEME OF VALUATION

1. Internal marks
 - Record = 10
2. External marks- 40
 - Practical-25
 - Viva = 10
 - IR Spectral analysis = 5 (Project work)

Total marks =50

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VUYYURU.

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SEMESTER – VI	SUBJECT: CHEMISTRY	PAPER CODE:CHE-601GE
PAPER TITLE : ANALYTICAL METHODS IN CHEMISTRY, Paper – VII		

60hrs (4h / w) Credits-3

UNIT-I

Quantitative analysis: (10+10+5+5)

15h

a) Importance in various fields of science, steps involved in chemical analysis. Principles of volumetric analysis :. Theories of acid-base, redox, complexometric, iodometric and precipitation titrations - choice of indicators for these titrations.

UNIT-II

Treatment of analytical data: (10+5)

8h

Types of errors, significant figures and its importance, accuracy - methods of expressing accuracy, error analysis and minimization of errors, precision - methods of expressing precision, standard deviation and confidence limit.

UNIT-III

Separation Techniques in Chemical analysis(10+10+5)

15h

SOLVENT EXTRACTION: Introduction,principle,techniques,factors affecting solvent Extraction, Batch extraction, continuous extraction and counter current extraction. Synergism. Application - Determination of Iron (III), organic mixture analysis.

ION EXCHANGE: Introduction, action of ion exchange resins, separation of inorganic mixtures, applications,

UNIT – IV

12h

Chromatography(10+5+5)

Classification of chromatography methods, principles of differential migration adsorption phenomenon, Nature of adsorbents, solvent systems, R_f values, factors effecting R_f values.

Paper Chromatography: Principles, R_f values, experimental procedures, choice of paper and solvent systems, developments of chromatogram - ascending, descending and radial. Two dimensional chromatography, applications.

UNIT -V (10+10+5+5)

10h

Thin layer Chromatography (TLC): Advantages. Principles, factors effecting R_f values. Experimental procedures. Adsorbents and solvents. Preparation of plates. Development of the chromatogram. Detection of the spots. Applications.

Column Chromatography: Principles, experimental procedures, Stationary and mobile Phases, Separation technique. Applications.

GC:Principle and applications

HPLC : Basic principles and applications.

List of Reference Books

1. Analytical Chemistry by Skoog and Miller
2. A textbook of qualitative inorganic analysis by A.I. Vogel
3. Nanochemistry by Geoffrey Ozin and Andre Arsenault
4. Stereochemistry by D. Nasipuri
5. Organic Chemistry by Clayden

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SEMESTER – VI	PAPER CODE : CHE-601GE
PAPER TITLE : ANALYTICAL METHODS IN CHEMISTRY, PAPER-VII	

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any FIVE of the following. Each question carries 5 marks. 5X5=25

1. What are co-precipitation and post-precipitation?
2. Write a short note on coagulation and peptization ?
3. What are significant figures? Explain their importance?
4. Write the applications of solvent extraction
- 5.
- 6.
- 7.
- 8.

SECTION-B

Answer any FIVE questions. Each question carries 10 marks. 5X10=50

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

The Guidelines to be followed by the question paper setters in chemistry for the

VI- Semester - end exams

SEMESTER – VI	PAPER CODE : CHE-601GE
PAPER TITLE : ANALYTICAL METHODS IN CHEMISTRY, PAPER-VII	

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (30 Marks)	1+1	1 + 1
Unit-2 (15 Marks)	1	1
Unit-3 (25 Marks)	1	1+1
Unit-4 (20 Marks)	1+1	1
Unit-5 (30 Marks)	1 +1	1 + 1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

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PRACTICAL SYLLABUS

Paper title: Chromatography & Volumetric analysis	Paper code : CHE-601GE-P
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Marks:50 30hrs (2 h /W) Credits-2

1. Identification of amino acids by paper chromatography.
2. Determination of Zn using EDTA
3. Determination of Mg using EDTA
4. Hardness of water.

SCHEME OF VALUATION

1. INTERNAL MARKS- Record-10M
2. EXTERNAL MARKS-40
 - Titrimetric analysis -30
 - Viva-10

TOTAL = 50 M

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SEMESTER – VI	SUBJECT: CHEMISTRY	PAPER CODE:CHE-602CE
PAPER TITLE : ORGANIC SPECTROSCOPIC TECHNIQUES, Cluster Elective Paper – VIII		

60hrs (4h / w) Credits-3

UNIT-I

NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY (10+10+5+5)

15h

Nuclear spin, Principles of NMR-Classical and Quantum Mechanical methods, Larmour Frequency. Instrumentation. Saturation, Relaxation spin-spin & spin lattice relaxation. Chemical shifts, Shielding and Deshielding mechanism-Factors influencing Chemical shift.

UNIT – II (10+5)

8h

Spin-Spin interactions-factors affecting spin-spin interactions, Deuterium exchange (H^+), coupling constant- types of coupling constant-vicinal, Geminal and long range coupling constant-Factors influencing coupling constants.
Types of PMR Spectrums –AX, AX2 and AB type with one example.

UNIT-III (10+10+5+5)

14h

Electron Spin Resonance Spectroscopy

Basic Principles, Theory of ESR, Comparison of NMR & ESR. Instrumentaion, Factors affecting the 'g' value, determination of 'g' value. Isotropic and Anisotropic constants. Splitting hyper fine splitting coupling constants. Line width, Zero field splitting and Kramer degeneracy. Crystal field splitting, Crystal field effects.

Applications:- Detection of free radicals; ESR spectra of (a) H^{\bullet} - radical (b)Deuterium radical (c) Methyl radical(CH_3) (d) Benzene anion ($C_6H_6^-$) (e) $[Cu(H_2O)_6]^{+2}$

UNIT-IV

UV & VISIBLE SPECTROSCOPY (10+10+5+5)

15h

Electronic spectra of diatomic molecules. The Born-oppenheimer approximation. Vibrational coarse structure: Intensity of Vibrational-electronic spectra: The Franck-Condon principle. Electronic structure of diatomic molecules. Types of transitions, Chromophores, Auxochrome, types of shifts in UV Visible spectrum, Conjugated dienes, trienes and polyenes, unsaturated carbonyl compounds-Woodward – Fieser rules.

UNIT-V (10+5)

8h

Electronic spectra of polyatomic molecules Chemical analysis by Electronic Spectroscopy – Beer-Lambert's Law. Deviation from Beer's law. Quantitative determination of metal ions (Mn^{+2} , Fe^{+2}). Simultaneous determination of Chromium and Manganese in a mixture.

REFERENCE BOOKS:

1. Electron Spin Resonance Elementary Theory and Practical Applications- John E. Wertz and James R. Bolton, Chapman and Hall, 1986.
2. Spectroscopic Identification of organic compounds – Silverstein, Basseler and Morrill.
3. Organic Spectroscopy- William Kemp.
4. Fundamentals of Molecular Spectroscopy- C.N.Banwell and E.A. Mc cash 4th Edition, Tata Mc GrawHillPublishing Co., Ltd. 1994.
5. Physical Methods in Inorganic Chemistry – R.S.Drago, Saunders Publications.
6. Application of Mössbauer Spectroscopy – Green Mood.
7. NMR, NQR, EPR and Mössbauer Spectroscopy in inorganic chemistry – R.VParish, Ellis, Harwood.
8. Instrumental Methods of Chemical Analysis- H.Kaur, Pragathi Prakashan, 2003.
9. Instrumental Methods of Analysis, 7th Edition – Willard, Merrit, Dean, Settle,CBS Publications, 1986.
10. Molecular Structure and Spectroscopy – G. Aruldas, Prentice Hall of IndiaPvt.Ltd, New Delhi, 2001.

SEMESTER – VI

PAPER-VIII

PAPER CODE : CHE-602CE

PAPER TITLE : ORGANIC SPECTROSCOPIC TECHNIQUES

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any FIVE of the following. Each question carries 5 marks. 5X5=25

1. Write about Nuclear spin?
2. What is Larmour frequency?
3. Write any two types of coupling constant?
4. Write about Kramer degeneracy?
5. What is isotropic and anisotropic constants?
6. Explain Woodward-Fieser rules?
7. Write a short note on Auxochrome?
8. Define and derive Beer-Lambert's law.

SECTION-B

Answer any FIVE questions. Each question carries 10 marks. 5X10=50

9. Explain the instrumentation of the NMR?
10. Explain Spin-Spin relaxation and spin lattice relaxation.
11. Write the types of PMR spectrums of AX,AX2 & AB?
12. Explain the instrumentation of the ESR.
13. Explain the ESR splitting of a) Deuterium radical b)[Cu(H₂O)₆]⁺² ion
14. Explain the electronic spectra of di atomic molecule.
15. Write note on Vibrational coarse structure.
16. Explain the simultaneous determination of Chromium and Manganese in a mixture.

The Guidelines to be followed by the question paper setters in chemistry for the VI-Semester - end exams

PAPER TITLE: ORGANIC SPECTROSCOPIC TECHNIQUES, PAPER CODE: CHE-602CE

Paper – VIII Maximum marks : 75 Duration : 3 Hours

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (Marks)	1+1	1+1
Unit-2 (Marks)	1	1
Unit-3 (Marks)	1+1	1+1
Unit-4 (Marks)	1+1	1+1
Unit-5 (Marks)	1	1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS),VUYYURU.

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(An Autonomous college in the jurisdiction of Krishna University)

SEMESTER – VI	SUBJECT: CHEMISTRY	PAPER CODE:CHE-603CE
PAPER TITLE : ADVANCED ORGANIC REACTIONS, Cluster Elective Paper – IX		

UNIT – I

60hrs (4h / w) Credits-3

ORGANIC PHOTOCHEMISTRY (10+10+5) 10hrs

Organic photochemistry : Molecular orbitals, carbonyl chromophore–triplet states, Jablonski diagram, inter–system crossing. Energy transfer.

Photochemical reactions: Photo reduction, - mechanism, example-aromatic compounds. sensitizer and influence of sensitizer.

UNIT – II

ORGANIC PHOTOCHEMISTRY (10+10+5) 12hrs

Norrish cleavages, type -I: Mechanism, acyclic cyclicdiones, Photo Fries rearrangement. Norrish type II cleavage: Mechanism and stereochemistry, Type- II reactions of esters: 1: 2 diketones, photo decarboxylation., Di - π methane Rearrangement, Photochemistry – of conjugated dienes, Decomposition of nitrites – Barton reaction.

UNIT – III

PROTECTING GROUPS AND ORGANIC REACTIONS (10+10+5+5) 15hrs

Principles of (1) Protection of alcohols – ether formation including silyl ethers – ester formation, (2) Protection of diols – acetal,ketal and carbonate formation, (3) Protection of carboxylic acids – ester formation, benzyl and t–butyl esters, (4) Protection of amines – acetylation, benzylation, benzyloxy carbonyl, triphenyl methyl groups and fmoc, (5) Protection of carbonyl groups – acetal, ketal, 1,2–glycols and 1,2–dithioglycols formation.

UNIT – IV

SYNTHETIC REACTIONS: (10+5+5)

8hrs

Mannich reaction – Mannich bases – Robinson annulations. The Shapiro reaction, Stork–enamine reaction. Use of dithioacetals – Umpolung, phase transfer catalysis – mechanisms and use of benzyl trialkyl ammonium halides. Wittig reaction.

UNIT – V : NEW SYNTHETIC REACTIONS(10+5+5) 15hrs

Define with example and mechanism- Suzuki coupling, Click reaction, Baylis–Hillman reaction, RCM olefin metathesis, Mukayama aldol reaction.

Define with one example: (Mechanism not required)

Mitsunobu reaction, McMurry reaction, Julia–Lythgoe olefination, Stille coupling and Heck reaction,

Recommended Books

1. Molecular reactions and Photochemistry by Charles Dupey and O.L. Chapman.
2. Molecular Photochemistry by Turru.
3. Importance of antibonding orbitals by Jaffe and Orchin.
4. Text Book of Organic Chemistry by Cram, Hammand and Henrickson.
5. Some modern methods of organic synthesis by W. Carruthers.
6. Guide Book to Organic Synthesis by R.K. Meckie, D.M. Smith and R.A. Atken.
7. Organic Synthesis by O.House.
8. Organic synthesis by Michael B. Smith.
9. Organic Chemistry Claydon and others 2005.
10. Name Reactions by Jie Jack Li
11. Reagents in Organic synthesis by B.P. Mundy and others.
12. Tandem Organic Reactions by Tse–Lok Ho.

SEMESTER – VI

PAPER-IX

PAPER CODE : CHE-603CE

PAPER TITLE : *ADVANCED ORGANIC REACTIONS*

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any FIVE of the following. Each question carries 5 marks. 5X5=25

1. Write about Chromophore triplet state?
2. Write about Barton reaction?
3. Explain how to protect the Carbonyl group?
4. Explain how to protect the Diols?
5. Explain about Umpolung?
6. Explain PTC with mechanism?
7. Explain Suzuki coupling?
8. Define with one example for Mc Murrey reaction and Stille coupling?

SECTION-B

Answer any FIVE questions. Each question carries 10 marks. 5X10=50

9. Explain about Jablonski diagram in organic photo chemistry?
10. Explain mechanism of photo reduction with examples?
11. Explain Norrish type –I cleavage with mechanism?
12. Explain Norrish type –II cleavage with mechanism?
13. Explain how to protect Alcohols?
14. Explain how to protect Carboxylic acids?
15. What is Mannich reaction? Explain with mechanism and Mannich bases?
16. Write the mechanism of Baylis-Hillman reaction and RCM Olefination?

The Guidelines to be followed by the question paper setters in chemistry for the VI- Semester - end exams

PAPER TITLE: ADVANCED ORGANIC REACTIONS, PAPER CODE: CHE-603CE

Paper – IX Semester – VI Maximum marks : 75 Duration : 3 Hours

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (Marks)	1	1+1
Unit-2 (Marks)	1	1+1
Unit-3 (Marks)	1+1	1+1
Unit-4 (Marks)	1+1	1
Unit-5 (Marks)	1+1	1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

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SEMESTER – VI	SUBJECT: CHEMISTRY	PAPER CODE:CHE-604CE
PAPER TITLE :PHARMACEUTICAL AND MEDICINAL CHEMISTRY Cluster Elective Paper –X		

60hrs (4h / w) Credits-3

UNIT-I (10+5+5) 12h
Pharmaceutical chemistry Terminology: Pharmacy, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics (ADME, Receptors - brief treatment) Metabolites and Anti metabolites.

UNIT-II (10+10+5) 10h
Drugs:
Nomenclature: Chemical name, Generic name and trade names with 10-examples
Classification based on structures and therapeutic activity with one example each.

UNIT-III 18h
Synthesis and therapeutic activity of the compounds:
a. Chemotherapeutic Drugs (10+10+5)
1.Sulphadruugs(Sulphamethoxazole) 2.Antibiotics - β -Lactam Antibiotics-Isolation of Pencilline by submerged culture method, 3. Anti malarial Drugs (chloroquine)
b. Psycho therapeutic Drugs: (10+5)
1.Anti pyretics(Paracetamol) 2.Hypnotics, 3.Tranquilizers(Diazepam) 4.Levodopa

UNIT-IV 8h
Pharmacodynamic Drugs: (10+5+5)
1. Antiasthma Drugs (Solbutamol) 2. Antianginals (Glycerol Trinitrate)
3. Diuretics (Frusemide)

UNIT-V 12h
HIV-AIDS: (10+5)
Immunity - CD-4cells, CD-8cells, Retro virus, Replication in human body, Investigation available, prevention of AIDS, Drugs available - examples with structures: PIS: Indivanir (crixivan), Nelfinavir(Viracept).

List of Reference Books:

1. Medicinal Chemistry by Dr. B.V.Ramana
2. Synthetic Drugs by O.D.Tyagi & M.Yadav
3. Medicinal Chemistry by Ashutoshkar
4. Medicinal Chemistry by P.Parimoo
5. Pharmacology & Pharmacotherapeutics R.S Satoshkar & S.D.Bhandenkar
6. Medicinal Chemistry by Kadametal P-I & P.II
7. European Pharmacopoeia

SEMESTER – VI	PAPER-X	PAPER CODE : CHE-604CE
PAPER TITLE : PHARMACEUTICAL AND MEDICINAL CHEMISTRY		

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any FIVE of the following. Each question carries 5 marks. 5X5=25

1. What are Metabolites and anti metabolites? Explain with example.
2. Write a note on Pharmacology and Pharmacophore.
3. Explain the classification of drugs on the basis of structure.
4. Describe the synthesis and therapeutic activities of Sulphamethoxazole.
5. Write the synthesis,therapeutic activity and side effects of paracetamol.
6. Write a note on Antianginals.
7. Write a note on Frusemide.
8. Explain about immunity.

SECTION-B

Answer any FIVE questions. Each question carries 10 marks. 5X10=50

9. What are Pharma cokinetics ? Describe Absorption,Distribution,Metabolism and Excretion(ADME)of drug.
10. Explain the classification of drugs based on therapeutic activity with examples.
11. Describe the nomenclature systems of drugs.
12. What are antibiotics ? Give examples. Explain the isolation method of pencillin by submerged culture method.
13. .Write the synthesis,therapeutic activity and side effects of Chloroquine.
14. Discuss the synthesis and therapeutic activity of Levodopa.
15. Explain in detail about antiasthma drugs.
16. What is AIDS?How it causes ? Write the drugs available for the treatment of AIDS with their structure?

The Guidelines to be followed by the question paper setters in chemistry for the VI- Semester - end exams

PAPER TITLE: PHARMACEUTICAL AND MEDICINAL CHEMISTRY, PAPER CODE: CHE-604CE

Paper – VIII-C-3 Semester – VI Maximum marks : 75 Duration : 3 Hours

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (Marks)	1+1	1
Unit-2 (Marks)	1	1+1
Unit-3 (Marks)	1+1	1+1+1
Unit-4 (Marks)	1+1	1
Unit-5 (Marks)	1	1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

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Practical syllabus

Paper title: Preparations of Organic compounds	Paper code : CHE-602CE-P
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30 hrs (2 h / W)

1. Preparation of Aspirin
2. Preparation of Paracetamol
3. Preparation of Acetanilide
4. Preparation of Barbutiric Acid
5. Preparation of Phenyl Azo β -naphthol

SCHEME OF VALUATION

1. INTERNAL MARKS- Record-10M
2. EXTERNAL MARKS-40
 - Titrimetric analysis -30
 - Viva-10

TOTAL = 50 M

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Practical syllabus

Paper title: Preparations of Organic compounds by Green procedure	Paper code : CHE-603CE-P
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30 hrs (2h / W)

1. Green procedure for organic qualitative analysis: Detection of N, S and halogens
2. Acetylation of 1o amine by green method: Preparation of acetanilide
3. Rearrangement reaction in green conditions: Benzil-Benzilic acid rearrangement
4. Electrophilic aromatic substitution reaction: Nitration of phenol
5. Radical coupling reaction: Preparation of 1, 1-bis -2-naphthol
6. Green oxidation reaction: Synthesis of adipic acid
7. Green procedure for Diels Alder reaction between furan and maleic anhydride

SCHEME OF VALUATION

1. INTERNAL MARKS- Record-10M

2. EXTERNAL MARKS-40

- Practical -30
- Viva-10

TOTAL = 50 M

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Department of Chemistry

Paper title: Project work	Paper code : CHE-604CE-P
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The students have chosen chemistry as cluster elective. Three projects have been selected and distributed the same among the students.

S.no	Name of the Project	No. of students allotted
1.	Instrumentation	
2.	Laboratory Reagents	
3.	Effects of Drugs	

SCHEME OF VALUATION

1. EXTERNAL- 25M- given by the Examiner (Viva)

2. INTERNAL = 25 M

- Written viva-10 M
- Submission of the project book-15M

TOTAL = 50 M